

# **COLLAPSIBLE HANDGRIP FOR INFLATOR**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

**[0001]** The present invention relates to a collapsible handgrip for inflator, such as a bicycle pump.

### **2. The Prior Arts**

**[0002]** A generic collapsible handgrip equipped inflator available in the market is usually provided with a foldable handgrip, which could be stored or carried easily when an inflator is not in use, or, on the contrary, it could be turned out for easy operation.

**[0003]** Figure 5 shows an inflator equipped with a conventional collapsible handgrip, generally designated with reference character (D), which is pivotally connected to one end of a shaft (B) of an air cylinder (A) through a pivot pin (C). A slot (D1) wider than the diameter of the shaft (B) is formed in a lateral wall of the handgrip (D). When the inflator is not in use, a user may rotate the handgrip (D) relatively to the shaft (B) such that the latter could be received in the handgrip (D) through the slot (D1). Further, the handgrip (D) could be aligned in line with the air cylinder (A) and stored or carried in that manner, or a user could hold the handgrip directly and operate axially to pump out the air inside the cylinder (A) through an outlet at one end thereof. However, the stroke range of the shaft (B) is relatively short due to the limitation of a bottom end (D2) of the handgrip (D). Hence, the volume in the cylinder is reduced and the air ejected is insufficient. Therefore, a preferred manner is to first turn the shaft (B) out of the handgrip (D), then bend the handgrip (D) to form a straight angle with the shaft (B) for improving the stroke range of the shaft (B) and hence the volume of the cylinder. Unfortunately, the L-type operation is rather awkward caused by a force moment existed between the handgrip (D) and the shaft (B) that would need some more improvements for raising the operation efficiency.

## SUMMARY OF THE INVENTION

[0004] The present invention is provided to eliminate a volume defect of cylinder of an inflator, which is aligned in-line with the handgrip when a collapsible handgrip of a conventional inflator is folded, as the primary object.

[0005] The present invention is provided to eliminate an operational defect, which is resulted when a collapsible handgrip of a conventional inflator is extended to form an L-type mechanism with a shaft, as another object.

[0006] The present invention is provided to improve the portability of an inflator, whose volume cannot be fully minimized when a collapsible handgrip thereof is folded, as yet another object.

[0007] In order to realize aforementioned objects and according to an embodiment of the present invention, a handgrip and a shaft are separately disposed. An opening and a tapped hole are arranged at two respective ends of the handgrip, in which the shaft is extended penetratingly through an air cylinder to form a stud at that end, so that the cylinder could be held to enter the handgrip through the opening and fixed by locking the stud to the tapped hole for receiving the cylinder in the handgrip and for minimizing the entire volume of the inflator. A user may draw the cylinder out of the handgrip, then lock the stud to the tapped hole through the other end to extend the length of the shaft for easy operation of inflation without affecting the volume efficiency of the cylinder.

[0008] Besides, an additional snap-fastening mechanism between the handgrip and the cylinder built with flange and groove also provided to enhance the positioning effect when the cylinder is stored in the handgrip.

[0009] Compared with a conventional inflator handgrip, the merits of the present invention may be summarized in the following:

[0010] (1) The volume efficiency of cylinder is not lowered when the handgrip and the shaft are extended and aligned.

[0011] (2) Inflating operation is relatively easy.

[0012] (3) A smaller packing volume is obtainable for portability and easy storage.

[0013] For more detailed information regarding advantages or features of the present invention, at least an example of preferred embodiment will be described below with reference to the annexed drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The related drawings in connection with the detailed description of the present invention to be made later are described briefly as follows, in which:

[0015] Figure 1 is a perspective view showing the structure of an air cylinder and handgrip of the present invention, as well as the separate state thereof;

[0016] Figure 2 is a perspective view showing the state when the air cylinder is stored in the handgrip;

[0017] Figure 3 is a perspective view showing the state when a stud on a shaft is to be locked to a tapped hole at one end of the handgrip of the present invention;

[0018] Figure 4 is a perspective view showing the state when the shaft is engaged with the handgrip of the present invention; and

[0019] Figure 5 is a perspective view showing an inflator equipped with a conventional collapsible handgrip.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] As shown in Figure 1, there is an air cylinder 1 and a hollowed cylindrical handgrip 2 included in an inflator according to an embodiment of the present invention. A piston (not shown) in the cylinder 1 is jointed with a shaft 13 having one end penetrated through a through hole 12 at one end of the cylinder 1, and the same end of the shaft 13 is provided with stud 131, while an outlet is arranged at the other end of the cylinder 1. In order to avoid any relative rotation between the shaft 13 and the cylinder 1, the cross section of the shaft 13 and its corresponding through hole 12 is by no means a circular section. As indicated in Figure 1, both the cross section of the shaft 13 and the through hole 12 are rectangular. Therefore, the shaft 13 can only perform an axial motion, not a spinning motion, to drive the piston in the cylinder 1 and pump the air inside out through the outlet 11.

[0021] The handgrip 2 is a hollow tubular body having an inner space 20, which is approximately equal to the cylinder 1 in length. On two opposite ends of the handgrip 2, there is a bottom wall 21 and an opening 22, respectively, in which a tapped hole 210 is centered in the bottom wall 21 for engaging with the stud 131, and the cylinder 1 is supposed to enter the inner space 20 of the handgrip 2 through the opening 22.

[0022] When the inflator is not in use, the cylinder 1 may be put penetrating through the opening 22 of the handgrip 2 to enter the inner space 20, then the stud 131 is locked in the tapped hole 210 to have the cylinder 1 fixed and received inside the handgrip 2 (as shown in Figure 2). When using the inflator is desired, a user is supposed to reverse the handgrip 2 shown in Figure 2 to detach it from the cylinder 1, and then, invert the handgrip 2 (shown in Figure 3) and lock the stud 131 to the tapped hole 210 of the bottom wall 21 (shown in Figure 4) to extend the length of the shaft 13 and meanwhile align the handgrip 2 and shaft 13 in line, so that the user may hold the cylinder 1 with one hand and the handgrip 2 with the other to move the shaft 13 axially for inflation.

[0023] Besides, in order to obtain a further positioning effect of the cylinder 1, an annular flange 14 is arranged on the outer wall of the cylinder 1 and an annular groove 23 corresponding with the flange 14 is formed in the inner wall of the handgrip 2, thereby the flange 14 will be squeezed into the annular groove 23 and the cylinder 1 is fixedly positioned when the cylinder 1 is entirely received in the handgrip 2. In the embodiment of the present invention, the flange 14 and the groove 23 are disposed adjacent to the outlet 11 and the opening 22, respectively, therefore, both ends of the handgrip 2 can be locked and positioned fixedly through the mated mechanism of the shaft and tapped hole and the paired flange and groove.

[0024] In the above described, at least one preferred embodiment has been described in detail with reference to the drawings annexed, and it is apparent that numerous changes or modifications may be made without departing from the true spirit and scope thereof, as set forth in the claims below.